WE CLAIM:

1. A face seal assembly for sealing between rotating components of a gas turbine engine mounted on a rotating shaft and a housing circumscribing the rotating components comprising:

an annular seal rotor adapted for mounting to the shaft, the seal having:

a metal rotor base portion having a radially extending rotor flange with first and second axially facing rotor surfaces, and

a first rotor ring mounted to the first axially facing rotor surface of the rotor flange by a first rotor braze joint,

an annular stator adapted for mounting to the housing, the stator having:

a metal stator base portion having a radially extending stator flange with first and second axially facing stator surfaces, and

a first stator ring mounted to the first axially facing stator surface of the stator flange by a first stator braze joint,

wherein one of said first and second axially facing rotor surfaces sealingly engages one of said first and second axially facing stator surfaces.

2. The face seal assembly according to claim 1, further comprising:

a second rotor ring mounted to the second axially facing rotor surface of the rotor flange by a second rotor braze joint; and

a second stator ring mounted to the second axially facing stator surface of the stator flange by a second stator braze joint.

3. The face seal assembly according to claim 1, wherein the first rotor braze joint and the first stator braze joint comprises a molybdenum ring disposed between two braze rings.

4. The face seal assembly according to claim 1, wherein the second rotor braze joint and the second stator braze joint comprises a molybdenum ring disposed between two braze rings.

5. The face seal assembly according to claim 3, wherein the molybdenum rings are formed from molybdenum bar stock.

6. The face seal assembly according to claim 3, wherein the molybdenum rings have a crystalline microstructure orientated perpendicular to the first and second axially facing surfaces of the flange.

7. The face seal assembly according to claim 3, wherein each of the braze rings is a silver and copper braze foil.

8. The face seal assembly according to claim 7, wherein each of the braze foils includes titanium.

9. The face seal assembly according to claim 8, wherein each of the braze foils comprises silver in the range of 62 to 71% weight, copper in the range of 26.3 to 36% weight, and titanium in the range of 1.5 to 6.0% weight.

10. The face seal assembly according to claim 2, wherein the first and second rotor rings, and the first and second stator rings, are formed from a ceramic.

11. The face seal assembly according to claim 10, wherein the ceramic is silicon nitride.

12. The face seal assembly according to claim 2, wherein:

the first rotor ring is formed from a ceramic and the second rotor ring is formed from low expansion metal; and

the first rotor braze joint is a single braze foil.

13. The face seal assembly according to claim 2, wherein:

the first stator ring is formed from a ceramic and the second stator ring is formed from low expansion metal; and

the first stator braze joint is a single braze foil.

14. A face seal assembly for sealing between rotating components of a gas turbine engine mounted on a rotating shaft and a housing circumscribing the rotating components comprising:

an annular seal rotor adapted for mounting to the shaft, the seal rotor having:

a metal rotor base portion having a radially extending rotor flange with first and second axially facing rotor surfaces,

a first rotor braze ring coupling the first axially facing rotor surface of the rotor flange to a first metal rotor ring,

a second rotor braze ring coupling the first metal rotor ring to a second metal rotor ring,

a third rotor braze ring coupling the second metal rotor ring to a first sealing rotor ring; and

an annular stator adapted for mounting to the housing, the stator having:

a metal stator base portion having a radially extending stator flange with first and second axially facing stator surfaces,

a first stator braze ring coupling the first axially facing stator surface of the stator flange to a first metal stator ring,

a second stator braze ring coupling the first metal stator ring to a second metal stator ring,

a third stator braze ring coupling the second metal stator ring to a first sealing stator ring;

wherein the first axially facing rotor surface sealingly engages the first axially facing stator surface.

15. The seal assembly according to claim 14, further comprising:

a fourth rotor braze ring coupling the second axially facing rotor surface of the rotor flange to a third metal rotor ring;

a fifth rotor braze ring coupling the third metal rotor ring to a fourth metal rotor ring;

a sixth rotor braze ring coupling the fourth metal rotor ring to a second rotor sealing ring;

a fourth stator braze ring coupling the second axially facing stator surface of the stator flange to a third metal stator ring;

a fifth stator braze ring coupling the third metal stator ring to a fourth metal stator ring; and

a sixth stator braze ring coupling the fourth metal stator ring to a second stator sealing ring.

16. The face seal assembly according to claim 15, wherein:

the first metal rotor ring, the third metal rotor ring, the first metal stator ring and the third metal stator ring are made of nickel; and

the second metal rotor ring, the fourth metal rotor ring, the second metal stator ring and the fourth metal stator ring are made of molybdenum.

17. The face seal assembly according to claim 15, wherein:

the first metal rotor ring, the third metal rotor ring, the first metal stator ring and the third metal stator ring are made of molybdenum; and

the second metal rotor ring, the fourth metal rotor ring, the second metal stator ring and the fourth metal stator ring are made of nickel.

18. The face seal assembly according to claim 14, wherein the molybdenum rotor rings and the molybdenum stator rings are formed from molybdenum bar stock.

19. The face seal assembly according to claim 14, wherein the molybdenum rotor rings and the molybdenum stator rings have a crystalline microstructure orientated perpendicular to the first and second axially facing surfaces of the flange.

20. The face seal assembly according to claim 14, wherein each of the braze rings is a silver and copper braze foil.

21. The face seal assembly according to claim 20, wherein each of the foils has titanium.

22. The face seal assembly according to claim 21, wherein each of the braze foils comprises silver in the range of 62 to 71% weight, copper in the range of 26.3 to 36% weight, and titanium in the range of 1.5 to 6.0% weight.

23. The face seal assembly according to claim 14, wherein both first and second rotor sealing rings, and both first and second stator sealing rings, are formed from a ceramic.

24. The face seal assembly according to claim 23, wherein the ceramic is silicon nitride.

25. The face seal assembly according to claim 15, wherein the first rotor sealing ring is formed from a ceramic and the third metal rotor ring, fifth rotor braze ring, fourth metal rotor ring, sixth rotor braze ring and second rotor sealing ring are replaced by a low expansion metal.

26. The face seal assembly according to claim 14, wherein the first stator sealing ring is formed from a ceramic and the third metal stator ring, fifth stator braze ring, fourth metal stator ring, sixth stator braze ring and second stator sealing ring are replaced by a low expansion metal.

27. A face seal assembly for sealing between rotating components of a gas turbine engine mounted on a rotating shaft and a housing circumscribing the rotating components comprising:

an annular seal stator adapted for mounting to the housing, the seal stator having

a metal stator base portion having a radially extending stator flange with first and second axially facing stator surfaces,

a first stator ring mounted to the first axially facing stator surface of the stator flange by a first stator braze joint, and

a second stator ring mounted to the second axially facing stator surface of the stator flange by a second stator braze joint; and

an annular seal rotor adapted for mounting to the shaft and having an axially facing surface that sealingly engages one of the first stator ring and the second stator ring.

28. The face seal assembly according to claim 27, wherein the first and second stator rings are formed from a ceramic.

29. The face seal assembly according to claim 27, wherein the first stator ring is formed from a ceramic and said second stator ring is formed from low expansion metal.

30. A seal stator for use in a face seal assembly for sealing between rotating components of a gas turbine engine mounted on a rotating shaft and a housing circumscribing the rotating components comprising:

a metal stator base portion having a radially extending stator flange with first and second axially facing stator surfaces;

a first ring mounted to the first axially facing stator surface of the stator flange by a first braze joint; and

a second ring mounted to the second axially facing stator surface of the stator flange by a second braze joint.

31. The seal stator according to claim 30, wherein each of the braze joints comprises a molybdenum ring disposed between two braze rings.

32. The seal stator according to claim 31, wherein the molybdenum rings are formed from molybdenum bar stock.

33. The seal stator according to claim 31, wherein the molybdenum rings have a crystalline microstructure orientated perpendicular to the first and second axially facing surfaces of the flange.

34. The seal stator according to claim 31, wherein each of the braze rings is a silver and copper braze foil.

35. The seal stator according to 34, wherein each of the braze foils includes titanium.

36. The seal stator according to 35, wherein each of the braze foils comprises silver in the range of 62 to 71% weight, copper in the range of 26.3 to 36% weight and titanium in the range of 1.5 to 6.0% weight.

37. The seal stator according to claim 31, wherein both first and second stator rings are formed from a ceramic.

38. The seal stator according to claim 37, wherein the ceramic is silicon nitride.

39. The seal stator according to claim 31, wherein the first stator ring is formed from a ceramic and the second stator ring is formed from low expansion metal.

40. A seal stator for use in a face seal assembly for sealing between rotating components of a gas turbine engine mounted on a rotating shaft and a housing circumscribing the rotating components comprising:

a metal stator base portion having a radially extending stator flange with first and second axially facing stator surfaces;

a first braze ring coupling the first axially facing stator surface of the stator flange to a first metal ring;

a second braze ring coupling the first metal ring to a second metal ring; and

a third braze ring coupling the second metal ring to a first sealing ring.

41. The seal stator according to claim 40, further comprising:

a fourth braze ring coupling the second axially facing stator surface of the stator flange to a third metal ring;

a fifth braze ring coupling the third metal ring to a fourth metal ring; and

a sixth braze ring coupling the fourth metal ring to the second sealing ring.

42. The seal stator according to claim 41, wherein:

the first metal ring and the third metal ring are made of nickel; and

the second metal ring and the fourth metal ring are made of molybdenum.

43. The seal stator according to claim 41, wherein:

the first metal ring and the third metal ring are made of molybdenum; and

the second metal ring and the fourth metal ring are made of nickel.

44. The seal stator according to claim 40, wherein the molybdenum rings are formed from molybdenum bar stock.

45. The seal stator according to claim 40, wherein the molybdenum rings have a crystalline microstructure orientated perpendicular to the first and second axially facing surfaces.

46. The seal stator according to claim 40, wherein each of the braze rings is a silver and copper braze foil.

47. The seal stator according to claim 46, wherein each of the braze foils includes titanium.

48. The seal stator according to claim 47, wherein each of the braze foils comprises silver in the range of 62 to 71% weight, copper in the range of 26.3 to 36% weight and titanium in the range of 1.5 to 6.0% weight.

49. The seal stator according to claim 40, wherein both first and second sealing rings are formed from a ceramic.

50. The seal stator according to claim 49, wherein the ceramic is silicon nitride.

51. The seal stator according to claim 40, wherein the first sealing ring is formed from a ceramic and a low expansion metal is brazed to second axially facing stator surface.

52. A method for sealingly engaging rotating components of a gas turbine engine mounted on a rotating shaft with a housing circumscribing the rotating components, comprising:

mounting an annular seal rotor onto the shaft, the seal rotor having metal rotor base portion with a radially extended rotor flange having first and second axially facing rotor surfaces;

mounting a first rotor ring to the first axially facing rotor surface of the rotor flange by a first rotor braze joint;

mounting an annular stator adapted to the housing, the stator having a metal stator base portion with a radially extended stator flange having first and second axially facing stator surfaces;

mounting a first stator ring to the first axially facing stator surface of the stator flange by a first stator braze joint; and

sealingly engaging one of said first and second axially facing rotor surfaces with one of said first and second axially facing stator surfaces.

53. The method according to claim 52, further comprising:

mounting a second rotor ring to the second axially facing rotor surface of the rotor flange by a second rotor braze joint; and

mounting a second stator ring to the second axially facing stator surface of the stator flange by a second stator braze joint.

54. The method according to claim 53, wherein the first rotor braze joint and the first stator braze joint comprise a molybdenum ring disposed between two braze rings.

55. The method according to claim 54, wherein the second rotor braze joint and the second stator braze joint comprise a molybdenum ring disposed between two braze rings.

56. The method according to claim 53, wherein the first rotor braze joint and the first stator braze joint comprise a molybdenum ring disposed between two braze rings to form a molybdenum subcomponent, and a nickel ring disposed between a third braze ring and the molybdenum subcomponent.

57. The method according to claim 56, wherein the second rotor braze joint and the second stator braze joint comprise a molybdenum ring disposed between two braze rings to form a molybdenum subcomponent, and a nickel ring disposed between a third braze ring and the molybdenum subcomponent.